CLAIMS

WE CLAIM

1. An encapsulant fluid, comprising a mixture of a diene-containing compound and a dienophilic compound, wherein

at least one of the diene-containing and the dienophilic compounds is protected so that the compounds do not substantially react with each other at room temperature, and

the diene-containing and the dienophilic compounds undergo a reversible Diels-Alder polymerization reaction at a polymerization temperature above room temperature to form a solid debondable polymeric encapsulant.

2. The encapsulant fluid of claim 1, having a viscosity of no more than 800 centistokes.

3. The encapsulant fluid of claim 2, wherein the viscosity is no more than 500 centistokes.

4. The encapsulant fluid of claim 3, wherein the viscosity is 10 to 200 centistokes.

5. The encapsulant fluid of claim 1, wherein the diene-containing compound contains at least one cyclic group.

6. The encapsulant fluid of claim 5, wherein the cyclic group is a furan group.

7. The encapsulant fluid of claim 6, wherein the diene-containing compound contains a plurality of furan groups.

8. The encapsulant fluid of claim 7, wherein the diene-containing compound is a bis(furan), tris(furan) or tetrakis(furan).

9. The encapsulant fluid of claim 1, wherein the diene-containing compound contains silicon.

10. The encapsulant fluid of claim 1, wherein the dienophilic compound contains at least one maleimide group.

11. The encapsulant fluid of claim 10, wherein the dienophilic compound contains a plurality of maleimide groups.

12. The encapsulant fluid of claim 1, wherein the dienophilic compound is protected.

13. The encapsulant fluid of claim 12, wherein the dienophilic compound is protected by a capping furanic moiety.

14. The encapsulant fluid of claim 13, wherein the capping furanic moiety is a monofuranic moiety.

15. The encapsulant fluid of claim 1, wherein the diene-containing compound is protected.

16. The encapsulant fluid of claim 15, wherein the diene-containing compound is protected by a protecting moiety.

17. The encapsulant fluid of claim 16, wherein the protecting moiety is a butadiene or isoprene.

18. The encapsulant fluid of claim 1, wherein compounds exhibit sufficiently low reactivity such that the viscosity of encapsulant fluid does not substantially change for at least 24 hours at room temperature.

19. The encapsulant fluid of claim 18, wherein the viscosity of encapsulant fluid does not substantially change for at least 7 days at room temperature.

20. A slider in contact with the encapsulant fluid of claim 1.

21. A method for producing a slider assembly, comprising:

(a) arranging a plurality of sliders each having a surface such that the surfaces are coplanar to each other;

(b) dispensing a fluid mixture of a diene-containing compound and a dienophilic compound to bond the sliders without contacting the coplanar slider surfaces, wherein at least one of the diene-containing and the dienophilic compounds is protected so that the compounds do not substantially react with each other at room temperature; and

(c) heating the fluid mixture to a temperature sufficient to effect reversible Diels-Alder polymerization of the diene-containing and dienophilic compounds to form a debondable solid encapsulant from the fluid mixture, thereby producing the slider assembly.

22. The method of claim 21, wherein step (a) comprises placing the sliders on a laminate of a flexible tape and an adhesive such that slider surfaces contact the adhesive.

23. The method of claim 22, wherein the adhesive is resistant or impervious to solvation by the fluid mixture.

24. The method of claim 21, wherein the sliders are arranged in an array in step (a).

25. The method of claim 24, wherein the array is a rectilinear array.

26. The method of claim 21, wherein step (c) is carried out at a polymerization temperature of at least about 50°C.

27. The method of claim 21, wherein the slider assembly formed has a contiguous planar surface comprised of at least one encapsulant region and containing the coplanar slider surfaces.

28. The method of claim 27, further comprising, after step (c),

(d) applying a resist layer on the contiguous planar surface;

(e) removing a portion of the resist layer to uncover a portion of at least one of the coplanar slider surfaces in a patternwise manner; and

(f) adding material to and/or removing material from the uncovered portion of the at least one coplanar slider surfaces, thereby patterning the at least one of the coplanar slider surfaces,

wherein the encapsulant is chemically stable upon exposure to any fluid employed in steps (d), (e), and/or (f).

29. The method of claim 28, further comprising, after step (d) and before step (e), exposing the resist layer to photons in the patternwise manner.

30. The method of claim 28, further comprising, after step (f), (g) heating the encapsulant to effect depolymerization of the polymeric encapsulant.

31. The method of claim 30, wherein step (g) is carried out in the presence of a solvent, a monofunctional diene, a dienophile, or a combination of any of the foregoing.

32. The method of claim 31, wherein step (g) is carried out in the presence of a solvent and a monofunctional diene.

33. The method of claim 31, wherein step (g) is carried out in the presence of a solvent and a dienophile.

34. The method of claim 31, wherein the solvent is comprised of N-methylpyrrolidone.

35. The method of claim 30, wherein the encapsulant is heated to a depolymerization temperature of at least about 120°C.